HS&E

SCOPE FOR
POND SEDIMENT CONTROL

REMOVAL OF SEDIMENT BUILD UP
(PONDS A-4, B-5, AND C-2)

Prepared for:

FACILITIES ENGINEERING DEPARTMENT
Rocky Flats Plant
North American Space Operations
Rockwell International

Authorization No. 492065

January, 1989

Prepared by:

MERRICK & COMPANY
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Reviewed for
Classification

By: Dennis M. Kane

Date: June 30, 1989

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I. INTRODUCTION

This Scope and Estimate evaluated the requirements for the removal of the sediments from ponds A-4, B-5 and C-2 as a routine maintenance function. The requirement for the periodic removal of sediments from Surface Water Control Ponds is a condition of the National Pollution Discharge Elimination System (NPDES) permit. As these ponds are the last retention facilities on their various drainage basins, the removal of these sediments will allow the pond systems to be properly operated with no release of settleable sediment particles.

II. SOLUTION

Perform dredging activities to reduce sediment build up in ponds A-4, B-5, and C-2. Dredging limits will approximately coincide with the original pond bottom configuration.

III. RECOMMENDATIONS

A. Expedite design and implementation of sediment removal to minimize the chances of an NPDES violation and maximize available sediment storage volume.

B. Lower pond water levels as far in advance of the dredging as is practical from an operation viewpoint.

IV. SOLUTION ORGANIZATION

A. Construction Preparation

1. Draw down existing pond water levels as far as possible.

2. Construct and/or install cofferdams, or bypass and diversion facilities at upstream end of pond.

3. Construct access roads and dewatering areas.

B. Removals

1. Remove accumulated sediments from the ponds.

a) Remove sediments to original ground lines.

b) Dewater sediments.

c) Load and haul away for disposal at the designated site.

C. Installation

1. Coordinate the installation of bank stabilization measures with sediment removal to maintain bank stability for ponds A-4 and B-5.

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D. Post Construction

1. Regrade site to blend into existing contours. Leave access roads for future maintenance of the ponds.

2. Place topsoil and revegetate disturbed areas.

V. NOTES AND ASSUMPTIONS

A. Sediment probes should be accomplished as a part of a geotechnical investigation to determine removal volumes. This Scope and Estimate assumes between 6 and 7 percent of the existing spillway volume to be the sediment volumes. It should be noted that the cost estimate is only moderately sensitive to changes in the volumes of sediment to be removed.

B. Geotechnical investigations should be performed to determine if the removal of sediment will contribute to bank instability. This Scope and Estimate assumes that the installation of bank stabilization measures will be required for ponds A-4 and B-5. This assumption is based on the reference to numerous slope failures within the pond basins in a Conceptual Design Report (CDR) prepared by Merrick & Company and Woodward-Clyde Consultants. The CDR was prepared to obtain funding for the removal of sediments from ponds upstream of those discussed in this Scope and Estimate. The geotechnical investigation should also determine a drawdown rate which will not contribute to bank instability.

C. Engineering will include the design and preparation of construction bid documents for the dewatering system, sediment removal from the ponds, further dewatering of removed sediments, haul roads and hauling for disposal, and restoring the work area at the close of the project.

D. The work should be performed during the dry months of the year to limit the amount of stream flow that must be addressed by cofferdamming, piping and pumping.

E. The dewatering of pond A-4 can be accomplished by drawing down the levels in pond A-3 prior to construction and using this pond as the upstream cofferdam. This can be done since releases to pond A-4 are controlled at pond A-3. Pond B-5 and C-2 will require the construction of an upstream cofferdam since controls similar to the A-series ponds do not exist. It is assumed that the cofferdams can be constructed from materials within the immediate area of the pond. That is to say that materials will not have to be imported for this purpose. Water will be pumped from the cofferdam at B-5 over the hill to the A-4 pond. Pumping from pond C-2 cofferdam to pond B-5 is included in the estimate in order to allow for the sampling of detained waters before release downstream. Pumping from pond A-3 to the B-series ponds for work on the A-4 pond may not be required if the work is accomplished during the dryer months of the year. The capacity of pond A-3

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should be sufficient to impound stream flows for the duration of the construction on pond A-4. It should be noted that considerable cost savings may be achieved by combining the work under this Scope and Estimate with that of reconstructing the outlet works of the ponds. The dewatering and access road construction could be accomplished once for both projects.

F. Stabilized access roads will be constructed around each of the ponds to allow for the movement of excavation equipment and hauling of removed sediments. Gravel base materials have been estimated, however, other stabilization techniques should be considered during design.

G. The sizing of the cofferdams and pumping systems assumes that a failure of the cofferdam in an unusually heavy precipitation event during the construction effort will have no major effect beyond inundating the construction area and related setbacks. Sufficient time should be available to remove construction equipment from the pond basin in anticipation of a cofferdam failure. Repeating the dewatering effort and cleaning up the work area will be required should this event occur. A cofferdam failure would not release water down stream of the plant site since the existing dam and outlet work controls will remain operable throughout the duration of the work.

H. The estimate is based on removal of sediments by means of a drag line and hydraulic excavator, each handling approximately 50% of the sediments removed from the ponds. Consideration should be given to other methods during the initial design stages.

I. The estimate assumes that the slope stabilization performed the on pond B-5 embankments in 1984 does not eliminate the potential for future slides in this basin. Stabilization is assumed to be required for work within ponds A-4 and B-5. Pond C-2 is in a basin assumed to have more gradual and stable embankment slopes. The estimate does not include slope stabilization for this pond. These assumptions will have to be confirmed by a geotechnical analysis during the design. Instrumentation to monitor movement may be required for the hills above each of the ponds to minimize the potential for slope failure. Instrumentation is estimated only for ponds A-4 and B-5. If movement is detected, work will be stopped and efforts to stabilize the slope should be undertaken.

J. Removed sediments will be land filled on the RFP within a 6 mile round trip haul distance from the ponds.

K. Sediments removed from the ponds will be windrowed near the pond to allow drainage before loading into trucks for hauling to the fill area. Windrows should be placed so that drainage does not effect the work area.

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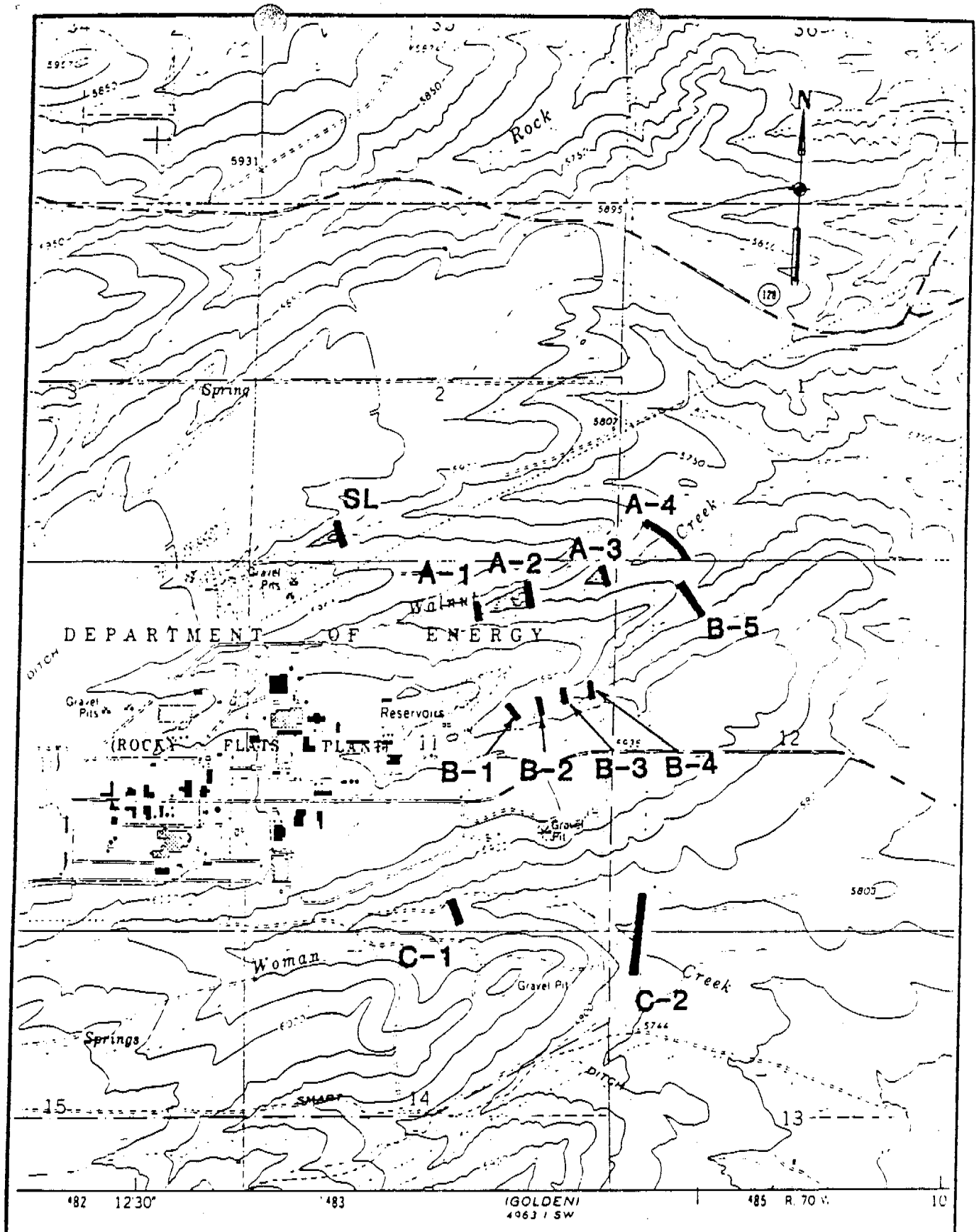
L. All disturbed areas at the work site will be regraded to blend with natural contours and reseeded for erosion control and slope stability. Access roads will be left in place for future maintenance work on the ponds.

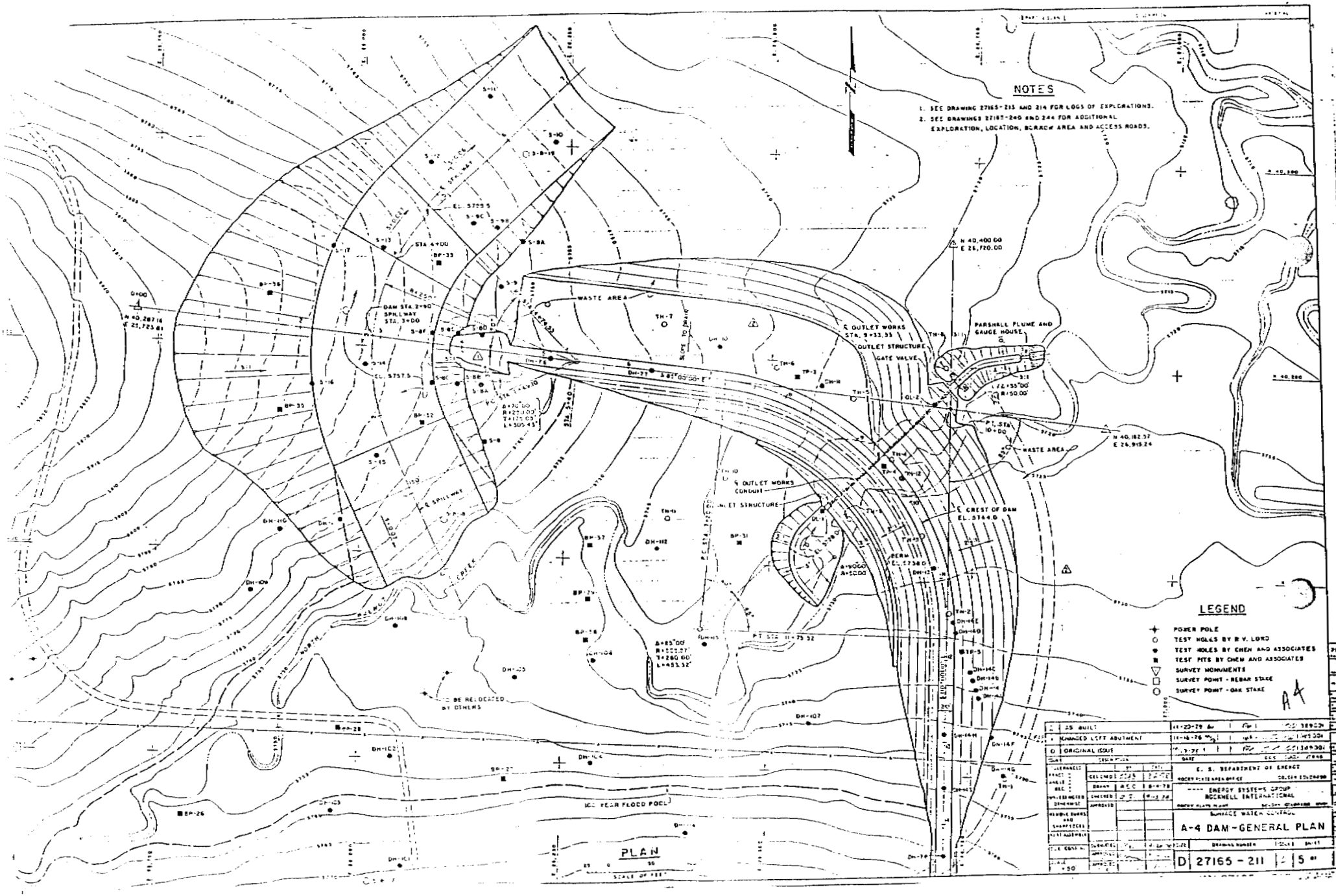
M. No improvements will be made on existing access roads.

N. Radiation monitoring, soil sampling and laboratory analysis will be performed on pond sediments to detect contamination. The estimate assumes that no contaminants will be found. However, it is assumed that the monitoring program will be required to demonstrate that contaminants do not exist.

APPENDIX A



LOCATION MAP



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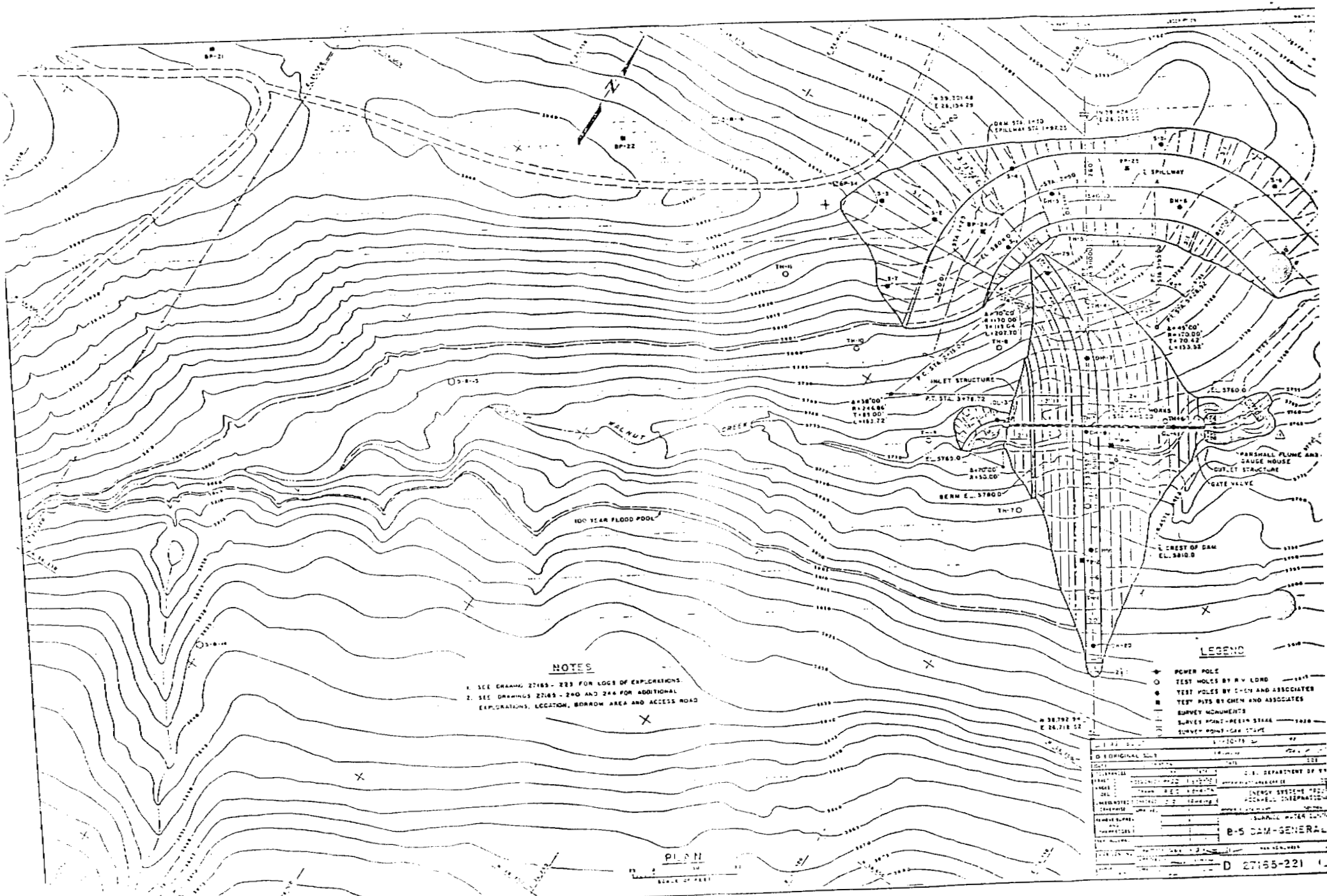
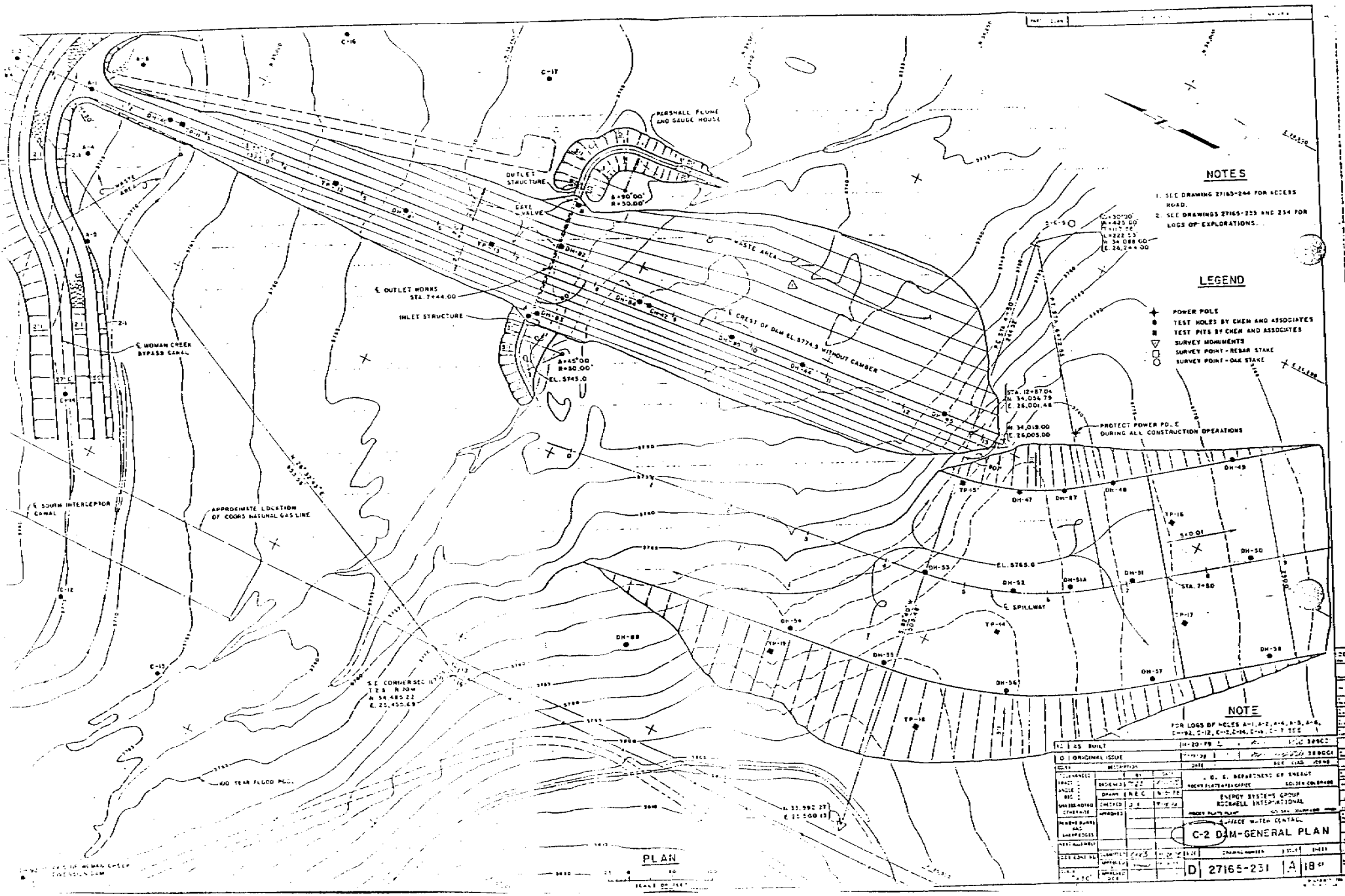
PLAN VIEW - 1.11 A4



PLAN VIEW-DAM B-5



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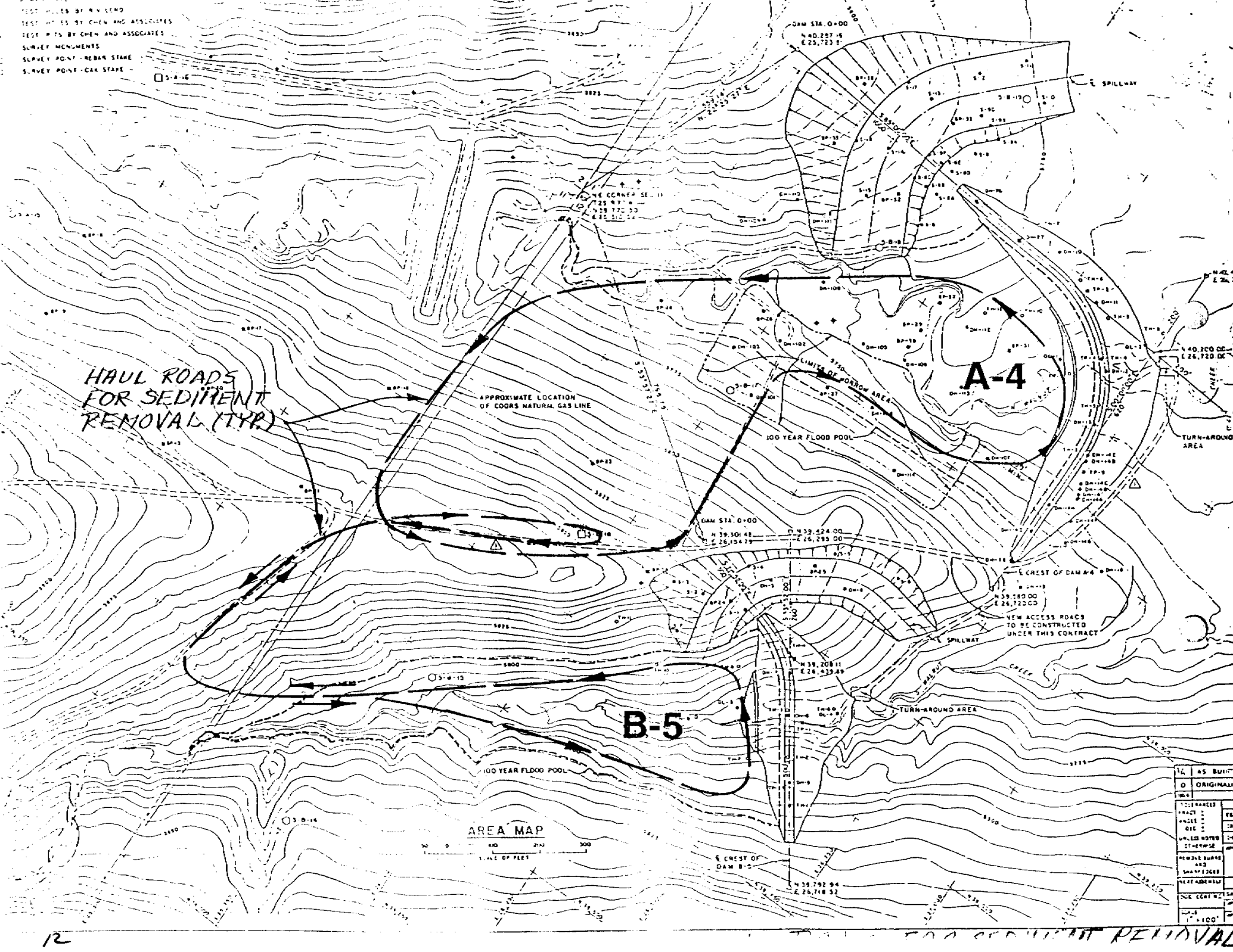
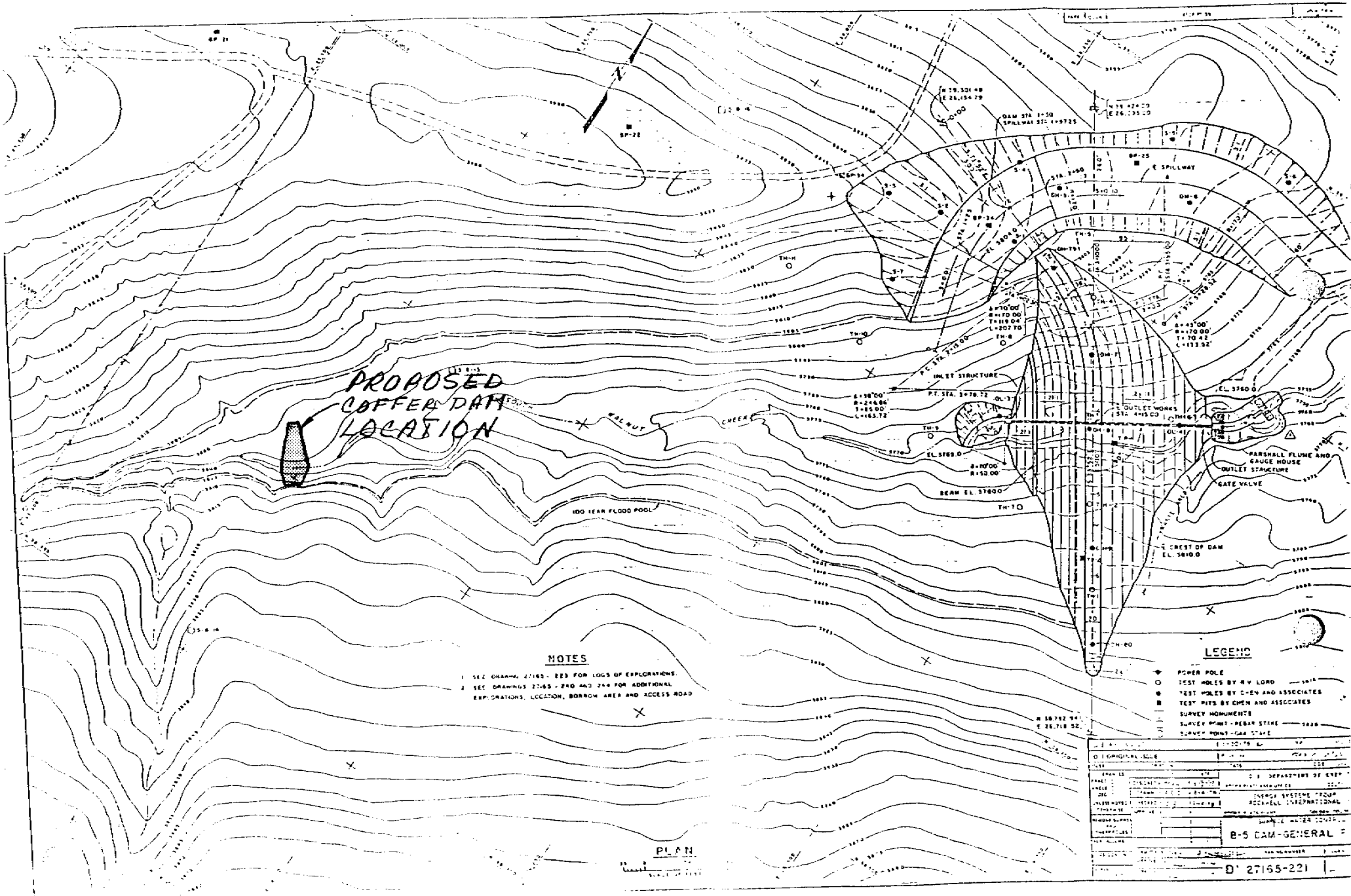
MAIN VIEW - DAM C 2


HAUL ROADS FOR SEDIMENT REMOVAL (TYP.)
A-4
B-5
APPROXIMATE LOCATION OF COORS NATURAL GAS LINE
100 YEAR FLOOD POOL
LIMITS OF BORROW AREA
E SPILLWAY
E CREST OF DAM A-4
NEW ACCESS ROAD TO BE CONSTRUCTED UNDER THIS CONTRACT
TURN-AROUND AREA
E CREST OF DAM B-5
AREA MAP



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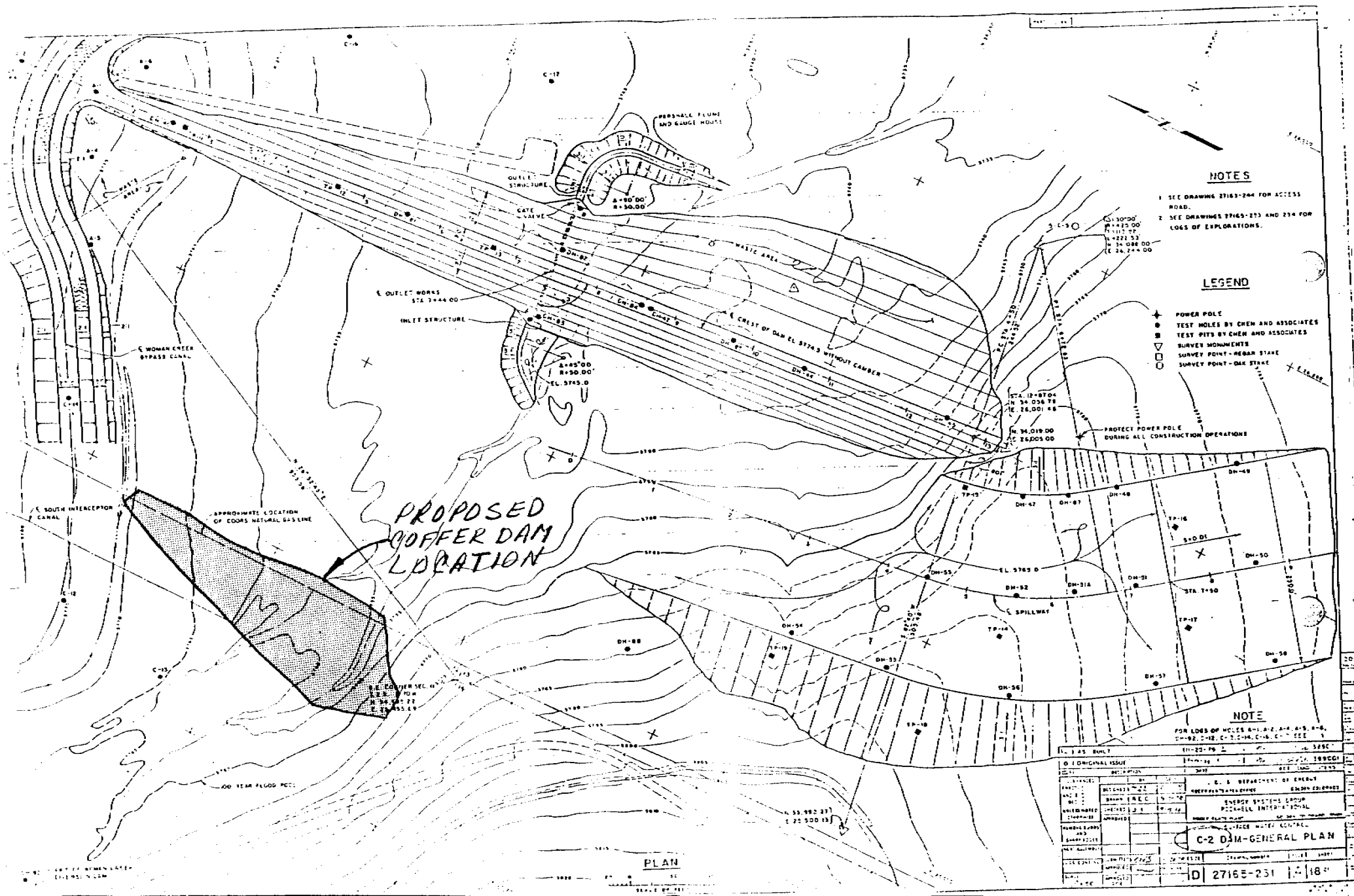
PROPOSED COFFER DAM LOCATION DAM B5



14 PROPOSED COFFERDAM LOCATION DAM C2

APPENDIX B

COST ESTIMATE-POND SEDIMENT CONTROL

Engineering, Design and Inspection at approximately 26 % of Construction and Removal Costs			$181,772
Title I, II, & III - Design		$172,232	
Inspection		$9,540	
Construction Costs			$699,182
Improvements to Land	DAM A4	$264,697	
	DAM B5	$264,050	
	DAM C2	$155,548	
New Buildings			
Building Modifications			
Other Structures			
Special Facilities			
Utilities			
Project and Construction Management		$14,687	
Standard Equipment			
Removal Cost Less Salvage			
Contingency Allowance @approximately 26 % of all other costs			$228,863
TOTAL PROJECT COST			$1,109,817

This estimate was prepared by Rockwell International, Facilities Engineering Department based on Conceptual Design Report, MONTH/YEAR.

POND SEDIMENT CONTROL

MANHOUR RECAP

PROJECT DISCIPLINE	TITLE I HOURS	TITLE II HOURS	TITLE III HOURS	TOTAL HOURS	RATE ($/HR)	TOTAL COST ($)
PROJECT MANAGER	31	46	16	93	$26.44	$2,459
ARCHITECT	0	0	0	0	$16.47	$0
STRUCTURAL ENGINEER	0	0	0	0	$16.92	$0
MECHANICAL ENGINEER	0	0	0	0	$21.67	$0
ELECTRICAL ENGINEER	0	0	0	0	$22.19	$0
CIVIL ENGINEER	208	262	224	694	$19.44	$13,491
SURVEYOR	216	0	0	216	$12.21	$2,637
TECHNICIAN	0	46	36	82	$14.18	$1,163
CAD DRAFTER	120	100	24	244	$10.96	$2,674
TYPIST	32	28	26	86	$9.57	$823
TOTAL DIRECT LABOR	607	482	326	1415		$23,248
OVERHEAD & G.A. (103.02%)						$23,950
TOTAL LABOR COST						$47,197
TOTAL MATERIAL COST						$1,870
TOTAL TRAVEL COST						$756
TOTAL OTHER COSTS (LIST):	GEOTECHNICAL CONSULTANTS= $7,500 LAB ANALYSIS= $60,000		SLOPE MONITORING= $41,100			$108,600
CLOSE-OUT COST						$316
TOTAL COST						$158,740
FIXED FEE (8.5%)						$13,493
CPFF						$172,232

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PROJECT:POND SEDIMENT CONTROL — CONTRACTOR: MERRICK & COMPANY / Architects and Engineers

CONTRACT: — ESTIMATE BY: B. KRULL

A. DRAWING LIST

	TITLE I	TITLE II & BID
1. TITLE SHEET	(3)	(3)
2. LOCATION PLAN	(3)	(3)
3. LEGEND AND SYMBOLS	(3)	(3)
4. DEMOLITION	( )	( )
5. P & ID'S		
new -	( )	( )
revised -	( )	( )
6. ARCHITECTURAL		
new -	( )	( )
revised -	( )	( )
7. CIVIL/STRUCTURAL		
new -	(14)	(3)
revised -	( )	(14)
8. MECHANICAL/UTILITIES		
new -	( )	( )
revised -	( )	( )
9. ELECTRICAL		
new -	( )	( )
revised -	( )	( )
10. INSTRUMENTATION		
new -	( )	( )
revised -	( )	( )
11. OTHER		
new -	( )	( )
revised -	( )	( )
TOTAL	23	26

INDEX OF DRAWINGS:

DWG. NO.	SHEET TITLE
	(3) AREA PLANS
	(3) PLAN SHEETS
	(3) TYPICAL SECTION
	(2) COFFER DAM
	(6) DETAIL SHEET-TITLE II
	"(3) INDEPENDANT PACKAGES"

B. MATERIAL COST

	TITLE I # sets	TITLE II # sets	BID PKG # sets	COST per sht	TOTAL COST
1. SPECS:# pgs= 150	5	5	25	$0.10	$525.00
2. MYLARS	2	2		$3.64	$356.72
3. BLUEPRINTS	5	5	25	$0.42	$375.90
4. REDUCED COPIES	5	5	5	$0.30	$112.50
5. MISC MAT'LS (LIST):				LUMP SUM	$500.00
				TOTAL===>	$1,870.12

C. TRAVEL COST

	TITLE I # trips	TITLE II # trips	TITLE III # trips	MILEAGE CHG $ per mile	TOTAL COST
1. PLANT SITE(80 miles)	12	4	29	$0.21	$756.00
2. MISC: miles= 0.00				$0.21	$0.00
				TOTAL===>	$756.00

D. TITLE I SERVICES	P.M.	ARCH	S.E.	M.E.	E.E.	C.E.	SURVEY	TECH	CAD	W.P.	SUBTOTAL
1. DRAWINGS	4					16			120	4	144
2. DESIGN	4					80					84
3. DESIGN SUMMARY	2					24					26
4. BACKUP INFORMATION						8	216				224
5. OUTLINE SPECIFICATION	2					12				16	30
6. PROJECT SCHEDULE	1					4					5
7. CONSTRUCTION ESTIMATE	2					8					10
8. QUALITY ASSURANCE	8					24					32
9. CONF./CORRESPONDENCE	4					16				8	28
10. ONSITE - KICKOFF MTG	4					4				2	10
- DATA COLL						8					8
- TITLE I REV						4				2	6
TITLE I SUBTOTAL=======>	31	0	0	0	0	208	216	0	120	32	607

E. TITLE II SERVICES	P.M.	ARCH	S.E.	M.E.	E.E.	C.E.	SURVEY	TECH	CAD	W.P.	SUBTOTAL
1. DRAWINGS	4					20			100	4	128
2. DESIGN	8					120					128
3. BACKUP INFORMATION											0
4. SPECS.- CONSTRUCTION	4					16		16		8	144
- G.F.E.											0
5. PROJECT SCHEDULE	4					4		2			10
6. CONSTRUCTION ESTIMATE	4					16		16			36
7. QUALITY ASSURANCE	4					24					28
8. CONF./CORRESPONDENCE	8					16				8	32
9. ONSITE - DATA COLL.						16					16
- TITLE II REV	4					6		6		4	20
- PRE-BID CONF						4		4			8
10. TECHNICAL EVALUATIONS	4					8				2	14
11. ADDENDA						8				2	10
12. BID ESTIMATE	2					4		2			8
TITLE II SUBTOTAL======>	46	0	0	0	0	262	0	46	100	28	582

F. TITLE III SERVICES	P.M.	ARCH	S.E.	M.E.	E.E.	C.E.	SURVEY	TECH	CAD	W.P.	SUBTOTAL
1. APPROVE VENDOR SUBM						4					4
2. VENDOR INSPECTIONS											0
3. MODIFICATIONS	4					32				8	44
4. AS-BUILT DRAWINGS						4		36	24		64
5. CONSTRUCTION REPORTS	4					32				16	52
6. ONSITE - PRECNST CONF						8				2	10
- CONSTR. OBSV	8					120					128
- FIN WALKTHRU						24					24
TITLE III SUBTOTAL=====>	16	0	0	0	0	224	0	36	24	26	326
TITLES I, II, & III====>	93	0	0	0	0	694	216	82	244	86	1515

POLICY & PROCEDURE - ECONOMIC ESCALATION RATES

Rockwell International

August 22, 1988

FISCAL YEAR	EQUIVALENT ANNUAL RATE (%)
1988	NA
1989	4.30
1990	4.55
1991	4.76
1992	4.97
1993	5.14
1994	5.25

Formula for Calculating the E.M. (ESCALATION MULTIPLIER) Rates:

$$E.M. = (1 + i/12)^n$$

Where:

i = Equivalent Annual Rate at Midpoint of Time Frame to (% / 100).

n = # of Months Between Date of Cost Data and Midpoint of Time Frame.

CALCULATIONS:

Project: POND SEDIMENT CONTROL

Date: 27 JAN 89

COST DATA	i	n	E.M.
ENGINEERING	N/A	9	1.000
CONSTRUCTION	4.55	12	1.046
P & CM	4.55	10	1.039

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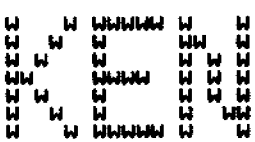

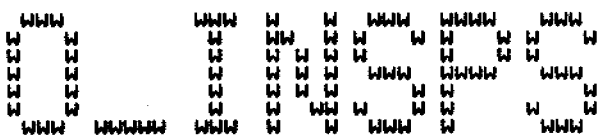

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POND SEDIMENT CONTROL DAM A4, B5, & C2 INSPECTION COST ESTIMATE - LONG FORM Job No: 252-6761K1 Date: 01-27-89

DESCRIPTION	QUANT	UNIT	MATERIAL UNIT COST	MATERIAL TOTAL	LABOR MAN HOURS/UNIT	LABOR TOTAL MAN HOURS	LABOR RATE	LABOR TOTAL LABOR COSTS	EQUIP EQUIP TOTAL	TOTAL
DIVISION 1 SECTION 01400 QUALITY CONTROL										
INSPECTION	(M)	120 DAY			2.000	240.00	38.00	9120		9,120
SUBTOTAL				0		240.00		9120	0.	9,120
Escalation	1.046			0		0.00		9540	0.	
Labor Mark-up								9540 -	9120	420 9,540
TOTAL SECTION 01400				0				9540	0.	$9,540
TOTAL DIVISION 1				0				9540	0.	$9,540

POND SEDIMENT CONTROL	DAM A4, B5, & C2	INSPECTION	Job No: 252-6761K1	Date: 01-27-89		
TOTAL DIVISION 1		0		9540	0.	$9,540
PROJECT TOTAL		0		9540	0.	$9,5[illegible]

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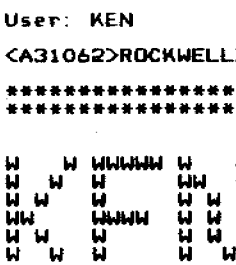

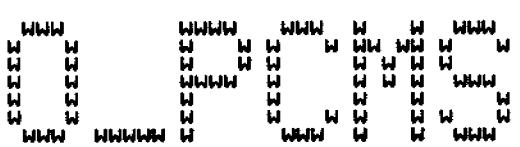

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POND SEDIMENT CONTROL DAM A4, B5, & C2 INSPECTION COST ESTIMATE - LONG FORM Job No: 252-6761K1 Date: 01-27-89

DESCRIPTION	QUANT	UNIT	MATERIAL UNIT COST	MATERIAL TOTAL	LABOR MAN HOURS/UNIT	LABOR TOTAL MAN HOURS	LABOR RATE	LABOR TOTAL LABOR COSTS	EQUIP EQUIP TOTAL	TOTAL
DIVISION 1										
SECTION 01100										
SPECIAL POLICY PROCEDURES										
PROJ ADMINISTRATOR (M)	150	DAY			2.000	300.00	38.00	11400		11,400
RADIATION MONITOR (RI)	9	DAY			8.000	72.00	38.00	2736		2,736
SUBTOTAL				0		372.00		14136	0.	14,136
Escalation	1.039			0		0.00		14687	0.	
Labor Mark-up								14687 -	14136	551
										14,687
TOTAL SECTION 01100				0				14687	0.	$14,687
TOTAL DIVISION 1				0				14687	0.	$14,687

POND SEDIMENT CONTROL	DAM A4, B5, & C2	INSPECTION	Job No: 252-6761K1	Date: 01-27-89		
TOTAL DIVISION 1		0		14687	0.	$14,687
PROJECT TOTAL		0		14687	0.	$14,687

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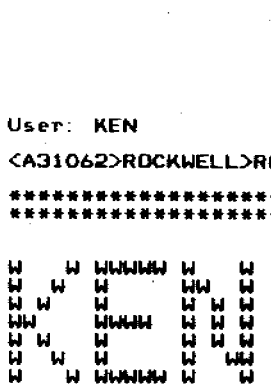

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COST ESTIMATE - LONG FORM

DESCRIPTION	QUANT	UNIT	MATERIAL UNIT COST	MATERIAL TOTAL	LABOR MAN HOURS/UNIT	LABOR TOTAL MAN HOURS	LABOR LABOR RATE	LABOR TOTAL LABOR COSTS	EQUIP EQUIP TOTAL	TOTAL
DIVISION 1										
SECTION 01050										
CONSTRUCTION SURVEY										
CONSTRUCTION SURVEY (M)	5	ACRE	25.00	125	14.540	72.70	14.27	1037		1,162
SUBTOTAL				125		72.70		1037	0.	1,162
Maintenance Mark-Up	1.050			131		0.00		1089	0.	
Overhead	1.150			151		0.00		1252	0.	
Profit	1.100			166		0.00		1377	0.	
Bond	1.003			166		0.00		1381	0.	
Escalation	1.046			174		0.00		1445	0.	
Labor Mark-up								1445 -	1037	408
Material Mark-up								174 -	125	49
										1,619
TOTAL SECTION 01050				174				1445	0.	$1,619
TOTAL DIVISION 1				174				1445	0.	$1,619

COST ESTIMATE - LONG FORM

DESCRIPTION		QUANT	UNIT	MATERIAL UNIT COST	MATERIAL TOTAL	LABOR MAN HOURS/UNIT	LABOR TOTAL MAN HOURS	LABOR RATE	LABOR TOTAL LABOR COSTS	EQUIP EQUIP TOTAL	TOTAL
DIVISION 2											
SECTION 02500											
HAUL ROAD											
EXCAVATION	(M)	3500	CY							1220.	1,220
OPERATOR	(M)	3500	CY			0.013	45.50	19.44	885		885
LABORER	(M)	3500	CY			0.007	24.50	14.27	350		350
12 " PIT RUN	(M)	2600	CY	4.50	11700					405.	12,105
OPERATOR	(M)	2600	CY			0.007	18.20	19.44	354		354
LABORER	(M)	2600	CY			0.004	10.40	14.27	148		148
HAULING	(M)	2600	CY							2805.	2,805
TEAMSTER	(M)	2600	CY			0.044	114.40	21.78	2492		2,492
COMPACTION	(M)	2600	CY							165.	165
OPERATOR	(M)	2600	CY			0.004	10.40	19.44	202		202
LABORER	(M)	2600	CY			0.002	5.20	14.27	74		74
CULVERT	(M)	30	LF	10.79	324					14.	338
OPERATOR	(M)	30	LF			0.029	0.87	19.44	17		17
LABORER	(M)	30	LF			0.118	3.54	14.27	51		51
GRADING	(M)	11000	SY							660.	660
OPERATOR	(M)	11000	SY			0.001	11.00	19.44	214		214
LABORER	(M)	11000	SY			0.001	11.00	14.27	157		157
SEEDING	(M)	12	MSF	11.30	136					35.	171
OPERATOR	(M)	12	MSF			0.154	1.85	19.44	36		36
SUBTOTAL					12160		256.86		4980	5304.	22,
Maintenance Mark-Up		1.050			12768		0.00		5229	5569.	
Overhead		1.150			14683		0.00		6013	6405.	
Profit		1.100			16151		0.00		6614	7045.	
Bond		1.003			16199		0.00		6634	7066.	
Escalation		1.046			16944		0.00		6939	7391.	
Labor Mark-up									6939 -	4980	1,959
Material Mark-up									16944 -	12160	4,784
Equipment Mark-up									7391 -	5304	2,087
											31,274
TOTAL SECTION 02500					16944				6939	7391.	$31,274

DESCRIPTION		QUANT	UNIT	MATERIAL UNIT COST	MATERIAL TOTAL	LABOR MAN HOURS/UNIT	LABOR TOTAL MAN HOURS	LABOR RATE	TOTAL LABOR COSTS	EQUIP EQUIP TOTAL	TOTAL
DIVISION 2											
SECTION 02770											
SEDIMENT REMOVAL											
POND TO WINDROW	(M)									5499.	5,499
DRAGLINE	(M)	5300	CY			0.029	153.70	19.44	2988		2,988
OPERATOR	(M)	5300	CY			0.028	148.40	14.27	2118		2,118
OILER	(M)	5300	CY							7644.	7,644
HYDRAULIC EXCAVATOR	(M)	5300	CY			0.029	153.70	19.44	2988		2,988
OPERATOR	(M)	5300	CY			0.028	148.40	14.27	2118		2,118
OILER	(M)	5300	CY							4056.	4,056
FRONT END LOADER	(M)	10600	CY			0.011	116.60	19.44	2267		2,267
OPERATOR	(M)	10600	CY			0.005	53.00	14.27	756		756
LABORER	(M)	10600	CY							1020.	1,020
GRADER	(M)	2	DAY			8.000	16.00	19.44	311		311
OPERATOR	(M)	2	DAY			4.000	8.00	14.27	114		114
LABORER	(M)	2	DAY							1426.	1,426
DOZER	(M)	2	DAY			8.000	16.00	19.44	311		311
OPERATOR	(M)	2	DAY			4.000	8.00	14.27	114		114
LABORER	(M)	2	DAY							14586.	14,586
HAUL	(M)	10600	CY			0.044	466.40	21.78	10158		10,158
TEAMSTER	(M)	10600	CY							532.	532
PUMP	(M)	14	DAY			2.000	28.00	19.44	544		544
OPERATOR	(M)	14	DAY			1.000	14.00	14.27	200		
LABORER	(M)	14	DAY							4056.	4,(
FRONT END LOADER	(M)	10600	CY			0.011	116.60	19.44	2267		2,267
OPERATOR	(M)	10600	CY			0.005	53.00	14.27	756		756
LABORER	(M)	10600	CY							14586.	14,586
HAUL	(M)	10600	CY			0.044	466.40	21.78	10158		10,158
TEAMSTER	(M)	10600	CY							124.	610
SEEDING	(M)	43	MSF	11.30	486	0.154	6.62	19.44	129		129
OPERATOR	(M)	43	MSF								53,000
EROSION CONTROL	(G)	10600	CY	5.00	53000	0.140	1484.00	14.27	21177		21,177
LABORER	(G)	10600	CY								
SUBTOTAL					53486		3456.82		59474	53529.	166,489
Maintenance Mark-Up		1.050			56160		0.00		62448	56205.	
Overhead		1.150			64584		0.00		71815	64636.	
Profit		1.100			71042		0.00		78996	71100.	
Bond		1.003			71255		0.00		79233	71313.	
Escalation		1.046			74533		0.00		82878	74594.	
Labor Mark-up									82878 -	59474	23,404
Material Mark-up									74533 -	53486	21,047
Equipment Mark-up									74593 -	53529	21,065
											232,004
TOTAL SECTION 02770					74533				82878	74594.	$232,004
TOTAL DIVISION 2					91477				89817	81984.	$263,278

POND SEDIMENT CONTROL DAM A4 Job No: 252-6761K1 Date: 01-27-89

TOTAL DIVISION 1	174	1445	0.	$1,619
TOTAL DIVISION 2	91477	89817	81984.	$263.
PROJECT TOTAL	91651	91262	81984.	$264,897

User: KEN -at

<A31062>ROCKWELL>ROOF>COST>DAM>0_B5

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Pathname: <A31062>ROCKWELL>ROOF>COST>DAM>0_B5
File last modified: 89-01-27 15:16:16 Fri

Spooled: 89-01-27 15:21:36 Fri [Spooler rev 19.1.]
Started: 89-01-27 15:21:40 Fri on: AMLC by: PRI

GREEN TRACK , 132 columns, high-speed dot matrix

POND SEDIMENT CONTROL DAM B5 Job No: 252-6761K1 Date: 01-27-89

COST ESTIMATE - LONG FORM

DESCRIPTION	QUANT	UNIT	MATERIAL UNIT COST	MATERIAL TOTAL	LABOR MAN HOURS/UNIT	LABOR TOTAL MAN HOURS	LABOR RATE	LABOR TOTAL LABOR COSTS	EQUIP EQUIP TOTAL	TOTAL
DIVISION 1										
SECTION 01050										
CONSTRUCTION SURVEY										
CONSTRUCTION SURVEY (M)	3	ACRE	25.00	75	14.540	43.62	14.27	622		697
SUBTOTAL				75		43.62		622	0.	697
Maintenance Mark-Up	1.050			79		0.00		653	0.	
Overhead	1.150			91		0.00		751	0.	
Profit	1.100			100		0.00		826	0.	
Bond	1.003			100		0.00		828	0.	
Escalation	1.046			105		0.00		866	0.	
Labor Mark-up								866 - 622	75	244
Material Mark-up								105 -		30
										971
TOTAL SECTION 01050				105				866	0.	$971
TOTAL DIVISION 1				105				866	0.	$971

DESCRIPTION		QUANT	UNIT	MATERIAL UNIT COST	MATERIAL TOTAL	LABOR MAN HOURS/UNIT	LABOR TOTAL MAN HOURS	LABOR LABOR RATE	LABOR TOTAL LABOR COSTS	EQUIP EQUIP TOTAL	TOTAL
DIVISION 2											
SECTION 02170											
TEMP COFFER DAM											
BORROW	(M)	1250	CY	4.50	5625					338.	5,963
OPERATOR	(M)	1250	CY			0.007	8.75	19.44	170		170
LABORER	(M)	1250	CY			0.004	5.00	14.27	71		71
HAUL	(M)	1250	CY							2338.	2,338
TEAMSTER	(M)	1250	CY			0.044	55.00	21.78	1198		1,198
COMPACTION	(M)	1250	CY							138.	138
OPERATOR	(M)	1250	CY			0.004	5.00	19.44	97		97
LABORER	(M)	1250	CY			0.002	2.50	14.27	36		36
PUMP	(M)	30	DAY							1140.	1,140
OPERATOR	(M)	30	DAY			2.000	60.00	19.44	1166		1,166
LABORER	(M)	30	DAY			1.000	30.00	14.27	428		428
SUBTOTAL					5625		166.25		3166	3954.	12,745
Maintenance Mark-Up		1.050			5906		0.00		3324	4152.	
Overhead		1.150			6792		0.00		3823	4774.	
Profit		1.100			7471		0.00		4205	5252.	
Bond		1.003			7493		0.00		4218	5268.	
Escalation		1.046			7838		0.00		4412	5510.	
Labor Mark-up									4412 -	3166	1,[illegible]
Material Mark-up									7838 -	5625	2,213
Equipment Mark-up									5510 -	3954	1,556
											17,759
TOTAL SECTION 02170					7838				4412	5510.	$17,759

DESCRIPTION		QUANT	UNIT	MATERIAL UNIT COST	MATERIAL TOTAL	LABOR MAN HOURS/UNIT	LABOR TOTAL MAN HOURS	LABOR RATE	LABOR TOTAL LABOR COSTS	EQUIP EQUIP TOTAL	TOTAL
DIVISION 2											
SECTION 02500											
HAUL ROAD											
EXCAVATION	(M)	2500	CY							1220.	1,220
OPERATOR	(M)	2500	CY			0.013	32.50	19.44	632		632
LABORER	(M)	2500	CY			0.007	17.50	14.27	250		250
12 " PIT RUN	(M)	1900	CY	4.50	8550					405.	8,955
OPERATOR	(M)	1900	CY			0.007	13.30	19.44	259		259
LABORER	(M)	1900	CY			0.004	7.60	14.27	108		108
HAULING	(M)	1900	CY							2805.	2,805
TEAMSTER	(M)	1900	CY			0.044	83.60	21.78	1821		1,821
COMPACTION	(M)	1900	CY							165.	165
OPERATOR	(M)	1900	CY			0.004	7.60	19.44	148		148
LABORER	(M)	1900	CY			0.002	3.80	14.27	54		54
CULVERT	(M)	30	LF	10.79	324					14.	338
OPERATOR	(M)	30	LF			0.029	0.87	19.44	17		17
LABORER	(M)	30	LF			0.118	3.54	14.27	51		51
GRADING	(M)	11000	SY							660.	660
OPERATOR	(M)	11000	SY			0.001	11.00	19.44	214		214
LABORER	(M)	11000	SY			0.001	11.00	14.27	157		157
SEEDING	(M)	12	MSF	11.30	136					35.	171
OPERATOR	(M)	12	MSF			0.154	1.85	19.44	36		36
SUBTOTAL					9010		194.16		3747	5304.	18,
Maintenance Mark-Up		1.050			9460		0.00		3934	5569.	
Overhead		1.150			10879		0.00		4524	6405.	
Profit		1.100			11967		0.00		4976	7045.	
Bond		1.003			12003		0.00		4991	7066.	
Escalation		1.046			12555		0.00		5221	7391.	
Labor Mark-up									5221 -	3747	1,474
Material Mark-up									12555 -	9010	3,545
Equipment Mark-up									7391 -	5304	2,087
											25,167
TOTAL SECTION 02500					12555				5221	7391.	$25,167

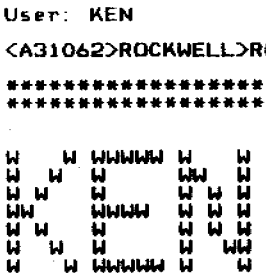
DESCRIPTION		QUANT	UNIT	MATERIAL UNIT COST	MATERIAL TOTAL	LABOR MAN HOURS/UNIT	LABOR TOTAL MAN HOURS	LABOR RATE	LABOR TOTAL LABOR COSTS	EQUIP EQUIP TOTAL	TOTAL
DIVISION 2											
SECTION 02770											
SEDIMENT REMOVAL											
POND TO WINDROW	(M)										
DRAGLINE	(M)	4300	CY							5499.	5,499
OPERATOR	(M)	4300	CY			0.029	124.70	19.44	2424		2,424
OILER	(M)	4300	CY			0.028	120.40	14.27	1718		1,718
HYDRAULIC EXCAVATOR	(M)	4300	CY							7644.	7,644
OPERATOR	(M)	4300	CY			0.029	124.70	19.44	2424		2,424
OILER	(M)	4300	CY			0.028	120.40	14.27	1718		1,718
FRONT END LOADER	(M)	8600	CY							4056.	4,056
OPERATOR	(M)	8600	CY			0.011	94.60	19.44	1839		1,839
LABORER	(M)	8600	CY			0.005	43.00	14.27	614		614
DOZER	(M)	2	DAY							1426.	1,426
OPERATOR	(M)	2	DAY			8.000	16.00	19.44	311		311
LABORER	(M)	2	DAY			4.000	8.00	14.27	114		114
HAUL	(M)	8600	CY							14586.	14,586
TEAMSTER	(M)	8600	CY			0.044	378.40	21.78	8242		8,242
PUMP	(M)	11	DAY							532.	532
OPERATOR	(M)	11	DAY			2.000	22.00	19.44	428		428
LABORER	(M)	11	DAY			1.000	11.00	14.27	157		157
WINDROW TO WASTE	(M)										
FRONT END LOADER	(M)	8600	CY							4056.	4,056
OPERATOR	(M)	8600	CY			0.011	94.60	19.44	1839		1,[illegible]
LABORER	(M)	8600	CY			0.005	43.00	14.27	614		
HAUL	(M)	8600	CY							14586.	14,[illegible]
TEAMSTER	(M)	8600	CY			0.044	378.40	21.78	8242		8,242
SEEDING	(M)	43	MSF	11.30	486					124.	610
OPERATOR	(M)	43	MSF			0.154	6.62	19.44	129		129
EROSION CONTROL	(G)	10600	CY	5.00	53000						53,000
LABORER	(G)	10600	CY			0.140	1484.00	14.27	21177		21,177
SUBTOTAL					53486		3069.82		51990	52509.	157,985
Maintenance Mark-Up		1.050			56160		0.00		54589	55134.	
Overhead		1.150			64584		0.00		62777	63405.	
Profit		1.100			71042		0.00		69055	69745.	
Bond		1.003			71255		0.00		69262	69954.	
Escalation		1.046			74533		0.00		72448	73172.	
Labor Mark-up									72448 -	51990	20,458
Material Mark-up									74533 -	53486	21,047
Equipment Mark-up									73172 -	52509	20,663
											220,153
TOTAL SECTION 02770					74533				72448	73172.	$220,153
TOTAL DIVISION 2					94926				82081	86072.	$263,079

POND SEDIMENT CONTROL DAM B5 Job No: 252-6761K1 Date: 01-27-89

TOTAL DIVISION 1	105	866	0.	$971
TOTAL DIVISION 2	94926	82081	86072.	$263.
PROJECT TOTAL	95031	82947	86072.	$264,050

User: KEN -at

<A31062>ROCKWELL>ROOF>COST>DAM>O_C2



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File last modified: 89-01-27.15:17:04.Fri

Spooled: 89-01-27.15:19:24.Fri [Spooler rev 19.1.]
Started: 89-01-27.15:21:24.Fri on: AMLC by: PRI

GREEN TRACK , 132 columns, high-speed dot matrix

DESCRIPTION	QUANT	UNIT	MATERIAL UNIT COST	MATERIAL TOTAL	LABOR MAN HOURS/UNIT	LABOR TOTAL MAN HOURS	LABOR LABOR RATE	LABOR TOTAL LABOR COSTS	EQUIP EQUIP TOTAL	TOTAL
DIVISION 1										
SECTION 01050										
CONSTRUCTION SURVEY										
CONSTRUCTION SURVEY (M)	9	ACRE	25.00	225	14.540	130.86	14.27	1867		2,092
SUBTOTAL				225		130.86		1867	0.	2,092
Maintenance Mark-Up	1.050			236		0.00		1960	0.	
Overhead	1.150			271		0.00		2254	0.	
Profit	1.100			298		0.00		2479	0.	
Bond	1.003			299		0.00		2486	0.	
Escalation	1.046			313		0.00		2600	0.	
Labor Mark-up								2600 -	1867	733
Material Mark-up								313 -	225	88
										2,913
TOTAL SECTION 01050				313				2600	0.	$2,913
TOTAL DIVISION 1				313				2600	0.	$2,913

COST ESTIMATE - LONG FORM

DESCRIPTION		QUANT	UNIT	MATERIAL UNIT COST	MATERIAL TOTAL	LABOR MAN HOURS/UNIT	LABOR TOTAL MAN HOURS	LABOR LABOR RATE	LABOR TOTAL LABOR COSTS	EQUIP EQUIP TOTAL	TOTAL
DIVISION 2											
SECTION 02170											
TEMP COFFERDAM											
BORROW	(M)	1250	CY	4.50	5625					338.	5,963
OPERATOR	(M)	1250	CY			0.007	8.75	19.44	170		170
LABORER	(M)	1250	CY			0.004	5.00	14.27	71		71
HAUL	(M)	1250	CY							2338.	2,338
TEAMSTER	(M)	1250	CY			0.044	55.00	21.78	1198		1,198
COMPACTION	(M)	1250	CY							138.	138
OPERATOR	(M)	1250	CY			0.004	5.00	19.44	97		97
LABORER	(M)	1250	CY			0.002	2.50	14.27	36		36
PUMP	(M)	30	DAY							1140.	1,140
OPERATOR	(M)	30	DAY			2.000	60.00	19.44	1166		1,166
LABORER	(M)	30	DAY			1.000	30.00	14.27	428		428
SUBTOTAL					5625		166.25		3166	3954.	12,745
Maintenance Mark-Up		1.050			5906		0.00		3324	4152.	
Overhead		1.150			6792		0.00		3823	4774.	
Profit		1.100			7471		0.00		4205	5252.	
Bond		1.003			7493		0.00		4218	5268.	
Escalation		1.046			7838		0.00		4412	5510.	
Labor Mark-up									4412 -	3166	1,[illegible]
Material Mark-up									7838 -	5625	2,213
Equipment Mark-up									5510 -	3954	1,556
											17,759
TOTAL SECTION 02170					7838				4412	5510.	$17,759

DESCRIPTION		QUANT	UNIT	MATERIAL UNIT COST	MATERIAL TOTAL	LABOR MAN HOURS/UNIT	LABOR TOTAL MAN HOURS	LABOR LABOR RATE	LABOR TOTAL LABOR COSTS	EQUIP EQUIP TOTAL	TOTAL
DIVISION 2											
SECTION 02500											
HAUL ROAD											
EXCAVATION	(M)	2000	CY							1220.	1,220
OPERATOR	(M)	2000	CY			0.013	26.00	19.44	505		505
LABORER	(M)	2000	CY			0.007	14.00	14.27	200		200
12 " PIT RUN	(M)	1500	CY	4.50	6750					405.	7,155
OPERATOR	(M)	1500	CY			0.007	10.50	19.44	204		204
LABORER	(M)	1500	CY			0.004	6.00	14.27	86		86
HAULING	(M)	1500	CY							2805.	2,805
TEAMSTER	(M)	1500	CY			0.044	66.00	21.78	1437		1,437
COMPACTION	(M)	1500	CY							165.	165
OPERATOR	(M)	1500	CY			0.004	6.00	19.44	117		117
LABORER	(M)	1500	CY			0.002	3.00	14.27	43		43
CULVERT	(M)	30	LF	10.79	324					14.	338
OPERATOR	(M)	30	LF			0.029	0.87	19.44	17		17
LABORER	(M)	30	LF			0.118	3.54	14.27	51		51
GRADING	(M)	11000	SY							660.	660
OPERATOR	(M)	11000	SY			0.001	11.00	19.44	214		214
LABORER	(M)	11000	SY			0.001	11.00	14.27	157		157
SEEDING	(M)	12	MSF	11.30	136					35.	171
OPERATOR	(M)	12	MSF			0.154	1.85	19.44	36		36
SUBTOTAL					7210		159.76		3067	5304.	15,5
Maintenance Mark-Up		1.050			7570		0.00		3220	5569.	
Overhead		1.150			8706		0.00		3703	6405.	
Profit		1.100			9577		0.00		4073	7045.	
Bond		1.003			9606		0.00		4085	7066.	
Escalation		1.046			10048		0.00		4273	7391.	
Labor Mark-up									4273 -	3067	1,206
Material Mark-up									10048 -	7210	2,838
Equipment Mark-up									7391 -	5304	2,087
											21,712
TOTAL SECTION 02500					10048				4273	7391.	$21,712

DESCRIPTION		QUANT	UNIT	MATERIAL UNIT COST	MATERIAL TOTAL	LABOR MAN HOURS/UNIT	LABOR TOTAL MAN HOURS	LABOR LABOR RATE	LABOR TOTAL LABOR COSTS	EQUIP EQUIP TOTAL	TOTAL
DIVISION 2											
SECTION 02770											
SEDIMENT REMOVAL											
POND TO WINDROW	(M)										
DRAGLINE	(M)	3900	CY							5499.	5,499
OPERATOR	(M)	3900	CY			0.029	113.10	19.44	2199		2,199
OILER	(M)	3900	CY			0.028	109.20	14.27	1558		1,558
HYDRAULIC EXCAVATOR	(M)	3900	CY							7644.	7,644
OPERATOR	(M)	3900	CY			0.029	113.10	19.44	2199		2,199
OILER	(M)	3900	CY			0.028	109.20	14.27	1558		1,558
FRONT END LOADER	(M)	7800	CY							4056.	4,056
OPERATOR	(M)	7800	CY			0.011	85.80	19.44	1668		1,668
LABORER	(M)	7800	CY			0.005	39.00	14.27	557		557
DOZER	(M)	2	DAY							1426.	1,426
OPERATOR	(M)	2	DAY			8.000	16.00	19.44	311		311
LABORER	(M)	2	DAY			4.000	8.00	14.27	114		114
HAUL	(M)	7800	CY							14586.	14,586
TEAMSTER	(M)	7800	CY			0.044	343.20	21.78	7475		7,475
PUMP	(M)	14	DAY							532.	532
OPERATOR	(M)	14	DAY			2.000	28.00	19.44	544		544
LABORER	(M)	14	DAY			1.000	14.00	14.27	200		200
WINDROW TO WASTE	(M)										
FRONT END LOADER	(M)	7800	CY							4056.	4,056
OPERATOR	(M)	7800	CY			0.011	85.80	19.44	1668		1,668
LABORER	(M)	7800	CY			0.005	39.00	14.27	557		557
HAUL	(M)	7800	CY							14586.	14,586
TEAMSTER	(M)	7800	CY			0.044	343.20	21.78	7475		7,475
SEEDING	(M)	43	MSF	11.30	486					124.	610
OPERATOR	(M)	43	MSF			0.154	6.62	19.44	129		129
SUBTOTAL					486		1453.22		28212	52509.	81,207
Maintenance Mark-Up		1.050			510		0.00		29623	55134.	
Overhead		1.150			587		0.00		34066	63405.	
Profit		1.100			646		0.00		37473	69745.	
Bond		1.003			648		0.00		37585	69954.	
Escalation		1.046			678		0.00		39314	73172.	
Labor Mark-up									39314 -	28212	11,102
Material Mark-up									678 -	486	192
Equipment Mark-up									73172 -	52509	20,663
											113,164
TOTAL SECTION 02770					678				39314	73172.	$113,164
TOTAL DIVISION 2					18564				47999	86072.	$152,635

POND SEDIMENT CONTROL DAM C2 Job No: 252-6761K1 Date: 01-27-89

TOTAL DIVISION 1	313	2600	0.	$2,913
TOTAL DIVISION 2	18564	47999	86072.	$152,635
PROJECT TOTAL	18877	50599	86072.	$155,548

CONTINGENCY ANALYSIS SUMMARY
(CSI FORMAT)

AUTHORIZATION NO.: PROJECT TITLE: POND SEDIMENT CONTROL

LOCATION: RFP

CONTINGENCY RANGE & MIDPOINTS

PLANNING	(20% - 30%)	25%	25	TITLE II	(5% - 15%)	10%
CONCEPTUAL	(15% - 25%)	20%		CWE-FP/MTC	(5% - 10%)	7.5%
TITLE I	(10% - 20%)	15%		CWE-CPFF	(10% -15%)	12.5%

ELEMENT OF COST/CSI DIVISION	COST	CONTINGENCY PERCENT	CONTINGENCY DOLLARS
ENGINEERING (TITLE I,II,II)	172,232	25 %	$43,058
CONSTRUCTION INSPECTION	9,540	25 %	$2,385
CONSTRUCTION & PROJECT MANAGEMENT	14,687	25 %	$3,672
1. GENERAL REQUIREMENTS	5,503	28 %	$1,513
2. SITEWORK	678,992	26 %	$179,235
3. CONCRETE		0 %	$0
4. MASONRY		0 %	$0
5. METALS		0 %	$0
6. WOOD & PLASTICS		0 %	$0
7. THERMAL & MOISTURE PROTECTION		0 %	$0
8. DOORS & WINDOWS		0 %	$0
9. FINISHES		0 %	$0
10. SPECIALTIES		0 %	$0
11. EQUIPMENT		0 %	$0
12. FURNISHINGS		0 %	$0
13. SPECIAL CONSTRUCTION		0 %	$0
14. CONVEYING SYSTEM		0 %	$0
15. MECHANICAL		0 %	$0
16. ELECTRICAL		0 %	$0
TOTAL	880,954	26 %	$228,863

ANALYSIS PERFORMED BY: _____ DATE: _____

REVIEWED BY PE: _____ DATE: _____

REVIEWED BY PA: _____ DATE: _____

APPROVED BY CE MANAGER: _____ DATE: _____

1. GENERAL REQUIREMENTS:_____

A. DESIGN COMPLETENESS

MORE COMPLETE THAN NEEDED	.75 - .95	
ADEQUATE FOR LEVEL OF ESTIMATE	1.00	1.00
LESS COMPLETE THAN NEEDED	1.05 - 1.10	
OTHER:_____	.75 - 1.10	

B. CONSTRUCTION COMPLEXITY

EQUIPMENT RENTAL	1.00 - 1.05	
MOBILIZE/DEMOBILIZE	1.00 - 1.10	
SCAFFOLDING	1.05 - 1.15	
QUALITY CONTROL	1.10 - 1.20	1.10
MATL HANDLING/WAREHOUSING	1.10 - 1.25	
CLEAN-UP	1.10 - 1.30	
OTHER:_____	1.00 - 1.30	

C. CONSTRUCTION SITE CONDITIONS *

UNOBSTRUCTED AREA	.85 - .95	
LIMITED OBSTRUCTION	.95 - 1.00	1.00
OBSTRUCTED AREA	1.00 - 1.10	
OTHER:_____	.85 - 1.10	

D. METHOD OF ACCOMPLISHMENT/MARKET CONDITIONS

FIXED PRICE (FP)	.85 - 1.15	1.00
MAINTENANCE	.95 - 1.05	
COST PLUS FIXED FEE (CPFF)	1.00 - 1.20	
OTHER:_____	.85 - 1.20	

MULTIPLIER A: 1.00 x B: 1.10 x C: 1.00 x D: 1.00 x MIDPOINT 25 % =27.50 % CONTINGENCY

* CONSTRUCTION SITE CONDITIONS:
UNOBSTRUCTED-MINIMAL W/S UTILITIES, UNCONGESTED AREA, NO CONTAMINATION, NO PROCESSES
LIMITED OBSTRUCTION-ONE OF THE ABOVE ITEMS NOT TRUE
OBSTRUCTED-TWO OR MORE OF THE ABOVE ITEMS NOT TRUE

A. DESIGN COMPLETENESS

MORE COMPLETE THAN NEEDED	.70 - .95	
ADEQUATE FOR LEVEL OF ESTIMATE	.90 - 1.00	
LESS COMPLETE THAN NEEDED	.95 - 1.05	1.05
OTHER:_____	.70 - 1.05	

B. CONSTRUCTION COMPLEXITY

IMPROVEMENTS TO LAND	.80 - .95	
EARTHWORK	.90 - 1.00	1.00
REMOVALS - COLD	.90 - 1.05	
UTILITIES - ABOVE GROUND	.95 - 1.10	
CAISSONS	1.00 - 1.15	
REMOVALS - ASBESTOS	1.10 - 1.20	
UTILITIES - BELOW GROUND	1.15 - 1.30	
REMOVALS - HOT	1.20 - 1.50	
OTHER:_____	.80 - 1.50	

C. CONSTRUCTION SITE CONDITIONS *

UNOBSTRUCTED AREA	.85 - .95	
LIMITED OBSTRUCTION	.95 - 1.00	1.00
OBSTRUCTED AREA	1.00 - 1.10	
OTHER:_____	.85 - 1.10	

D. METHOD OF ACCOMPLISHMENT/MARKET CONDITIONS

FIXED PRICE (FP)	.85 - 1.15	1.00
MAINTENANCE	.95 - 1.05	
COST PLUS FIXED FEE (CPFF)	1.00 - 1.20	
OTHER:_____	.85 - 1.20	

MULTIPLIER A: 1.05 x B: 1.00 x C: 1.00 x D: 1.00 x MIDPOINT 25 % =26.25 % CONTINGENCY

* CONSTRUCTION SITE CONDITIONS:
UNOBSTRUCTED-MINIMAL U/G UTILITIES, UNCONGESTED AREA, NO CONTAMINATION, NO PROCESSES
LIMITED OBSTRUCTION-ONE OF THE ABOVE ITEMS NOT TRUE
OBSTRUCTED-TWO OR MORE OF THE ABOVE ITEMS NOT TRUE

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